Goddard Procedures and Guidelines

DIRECTIVE NO. GPG 1270.3
EFFECTIVE DATE:
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NAME: A. V. Diaz
TITLE: Director

Responsible Office: 300/Office of Systems Safety and Mission Assurance

Title: THE GSFC QUALITY MANUAL

Preface

P1. PURPOSE

This Quality Manual describes the GSFC Quality Management System (QMS). The QMS is structured to conform to the requirements of ISO 9001.

P2. APPLICABILITY

This Quality Manual and the QMS herein established apply to the hardware, software, material, and services delivered to customers as a result of the following GSFC core processes at both the Greenbelt and Wallops facilities:

a. Science Enabling - This includes the grants process; providing data to the science community; science support tools; the proposal support process; and the science research management process;

b. Systems Development - This includes space flight systems; balloons; sounding rockets; aircraft experiments; ground systems; and data systems;

c. Program/Project Management - This includes cost, schedule and technical control; review and reporting; budgets; procurement; contracts; and safety and mission assurance;

d. Technology Enabling – This includes new concept studies; investment strategies; crosscutting developments; mission specific products; transfer; and commercialization;

e. Mission Operations - This includes customer service commitments, including Project Service Level Agreements and Project Commitment Documents.

P3. AUTHORITY

GPD 1270.3, GSFC Quality Management System (QMS)

P4. REFERENCES

a. ANSI/ASQC Q9001-1994, Quality Systems – Model for Quality Assurance in Design, Development, Production, Installation, and Servicing

b. ISO 8402-1994, Quality Management and Quality Assurance – Vocabulary

P5. CANCELLATION

None

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CHAPTER 1. Goddard Organization and Mission

1.1 Organization

The Goddard Space Flight Center (GSFC), located in Greenbelt, Maryland, is the NASA Center of Excellence for Scientific Research. In that capacity, GSFC plays a major role in Earth Science, Space Science and Technology Development and Infusion. In addition, GSFC has other responsibilities in the areas of NASA programs and Enterprise support and in support of NASA Headquarters business functions.

The operations of the Wallops Flight Facility (WFF), located near Chincoteague, Virginia, are overseen by GSFC. WFF primary areas of responsibility are sounding rockets, scientific balloons, observational science and scientific aircraft.

The GSFC organizational structure is addressed in Chapter 4.

1.2 Mission and Goals

The GSFC mission is to:

a. Enable discovery through leadership in earth and space science;

b. Serve the scientific community, inspire the Nation, foster education, and stimulate economic growth;

c. Partner with others to achieve NASA's goals;

d. Create technologies that support and advance these endeavors to take full advantage of doing research in space;

e. Accomplish this through innovation in all that we do.

The GSFC program and institutional goals are to:

a. Serve as a national resource for discovery in earth and space science and technology development;

b. Be an international Center of Excellence for research in Earth science, space science, and technology;

c. Enhance the Nation's technological and scientific literacy by sharing the information and knowledge that result from the performance of Goddard's mission;

d. Accomplish the Center's mission through a vital and effective workforce;

e. Maintain and upgrade GSFC core infrastructure, laboratory facilities, and equipment to preserve the Center's preeminence as a national resource and Center of Excellence;

f. Organize science, technology, flight mission, and business processes to achieve greater productivity;

CHAPTER 2. Control and Maintenance of the Quality Manual

The Quality Management System Council (QMSC) has responsibility for maintaining the Quality Manual in a current status. All proposed Manual changes, including changes to QMS GPG's (reference Manual Chapter 5) are submitted for Center Director approval through the QMSC in accordance with GPG 1410.1, Directives Management. Controlled, current versions of this manual and supporting QMS documents are available to employees and on-site contractors electronically via the GSFC Home Page link to the GSFC Quality Management System. Off-site access to this manual and QMS documentation is not prohibited, but is a function of applicable Home Page accessibility by off-site browsers. This manual and all QMS documentation is based upon a "paperless" system. Consequently, all printed versions of these documents are considered uncontrolled and should be verified for currency against electronic Master Lists (reference GPG 1410.1) prior to use.

CHAPTER 3. Definitions

Unless otherwise addressed herein, the definitions given in ISO 8402 apply to the implementation of the GSFC QMS. The following additional definitions are provided to assist in the understanding and application of the QMS.

3.1 Customer – The recipient of a product provided by GSFC. For purposes of the Quality Management System, the customer is assumed to be external to GSFC.

3.2 Customer Agreement – The documented agreement between the GSFC organization and the customer which establishes the requirements and resources for the product or service to be supplied.

3.3 GSFC – The Goddard Space Flight Center, Greenbelt, MD facility and the Wallops Flight Facility, Wallops Island, VA.

3.4 Product – Results of activities or processes. A product may include service, hardware, processed materials, software, or a combination thereof. A product can be tangible (e.g., assemblies or processed materials), intangible (e.g., knowledge or concepts), or a combination thereof. For the purposes of the QMS, the term "product" applies to the intended product offering only and not to unintended by-products affecting the environment (e.g., pollutants or unwanted effects).

3.5 Product Design Lead (PDL) - The manager or leader with overall responsibility for managing the design activity, managing the technical and organizational interfaces identified during design planning, and where required, forming and leading the product design team. The term refers to flight project managers, mission managers, instrument managers, subsystem technical managers, integrated product development team leaders, lead engineers, etc.

3.6 Product Manager – The individual designated as having management responsibility for a Project. A Product Manager may be assigned to any Directorate and have a title such as Project Manager, lead designer, Principle Investigator, RTOP Manager, or cognizant engineer.

3.7 Quality Management System (QMS) – The documented collection of policies, procedures, work instructions and quality records which delineate the implementation of the requirements of ISO 9001. At GSFC, the QMS consists of GPD 1270.3, this Manual, QMS GPG's identified in Chapter 5, Directorate-Level procedures and Work Instructions associated with the aforementioned GPG's, and associated quality records.

3.8 Quality Management System Council (QMSC) – A group of Directorate representatives, chaired by the Quality Management System Representative (QMSR), responsible for advising the QMSR regarding Quality Management System administration, maintenance, status reporting, and corrective action.

3.9 Quality Management System Representative (QMSR) – An individual designated by and reporting directly to the Center Director who has responsibility and authority for the effective implementation of the Quality Management System (QMS).

3.10 Subcontractor – The organization that provides a product to GSFC in a contractual situation.

3.11 Supplier – The organization that provides a product to the customer. For purposes of the Quality Management System, the supplier is GSFC.

CHAPTER 4. Management Responsibility

4.1 Quality Policy

- GSFC is committed to meeting or exceeding our customer's requirements

- We strive for excellence in all of our efforts

- Professionalism, integrity, and efficiency are our trademarks

- Customer satisfaction is our foremost objective

This quality policy is disseminated throughout the organization via official documents, awareness campaign material, ISO/QMS orientation and training, organizational meetings, and Internet Home Page postings.

The principle objective of this policy is to enhance GSFC ability to achieve stated program and institutional goals (see Chapter 1). Immediate objectives for quality are:

a. Systematic measurement, improvement, uniformity and consistency in our work processes;

b. Early definition/incorporation of customer requirements;

c. Improved risk assessment capability;

d. Increased customer involvement;

e. Accountability

4.2 Organization, Responsibilities, and Authorities

The GSFC organization chart, depicting lines of authority, is shown in Figure 1. Directorate level organizational charts, depicting lines of authority, are maintained as controlled documents within the respective Directorates.

4.2.1 Center Director

The GSFC Director has ultimately responsibility for ensuring that the quality policy is understood and implemented, by way of the QMS, at all levels of the organization which fall within its scope. The Director reviews the continuing suitability and effectiveness of the QMS annually, at a minimum.

GSFC ORGANIZATION

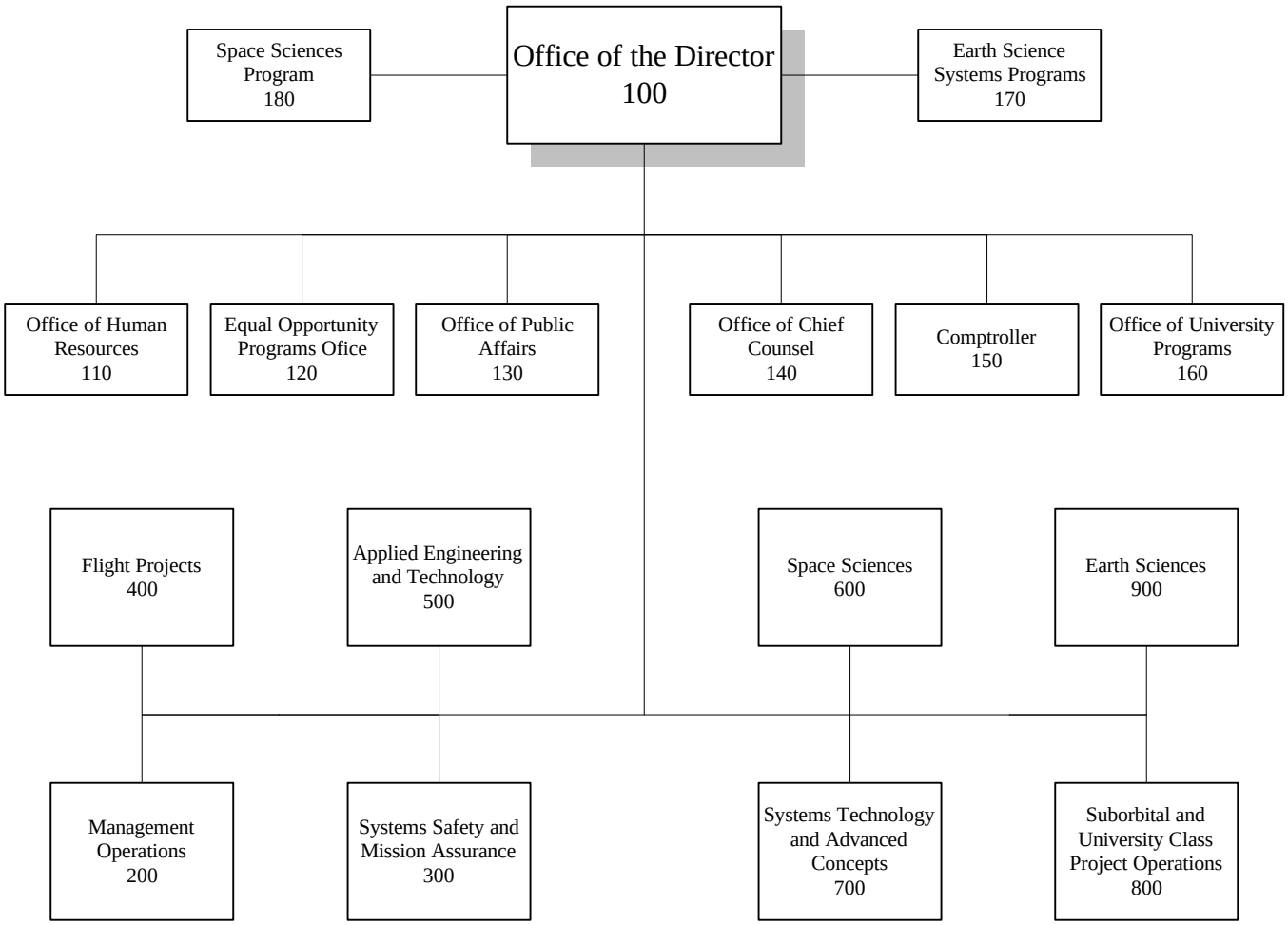

Figure 1

The Director is responsible for providing sufficient resources, including the assignment of trained personnel, for management, performance of work, and verification activities including internal quality audits.

4.2.2 Quality Management System Representative (QMSR)

The Director has appointed the Associate Director as the QMSR. The QMSR has the responsibility and authority to ensure that the QMS is established and maintained and that necessary corrective actions are identified and implemented. The QMSR reports on the effectiveness of the QMS to the Director in order to identify and implement necessary improvements.

4.2.3 Quality Management System Council (QMSC)

The QMSC has the responsibility to advise the QMSR on QMS administration and maintenance. It collects and analyzes QMS performance data for the QMSR, serves as the QMS Document Control Board for the Quality Manual and QMS GPG's, and reviews system level corrective actions.

4.2.4 Managers and Supervisors

All GSFC managers and supervisors are responsible for implementing the QMS within their organizations, including establishing and documenting the necessary work instructions, and requiring that their employees operate in compliance with the QMS.

4.2.5 Employees

All employees are responsible for performing assigned duties in accordance with applicable QMS requirements and for making appropriate notifications of processes which are unsafe or do not produce the required quality.

4.3 Management Review

The QMSR shall report to the Director at least annually on the effectiveness and suitability of the QMS. QMS metrics gathered through the reporting period shall be used to determine necessary improvements to the QMS.

4.4 GPG Implementing Management Responsibility Requirements

GPG 1060.1, Management Responsibility

CHAPTER 5. Quality System

5.1 QMS Documentation

The QMS is delineated within the GSFC Directives management and documentation system. Each document is traceable to and in compliance with applicable higher level documents. The QMS documentation is comprised of the following document levels, in descending order:

a. Policy and Manual -Represented by GPD 1270.3 and this GPG respectively.

b. QMS GPG's – Goddard Procedures and Guidelines (GPG's) associated with the Quality Management System outline the baseline approach to be used in complying with the requirements outlined in this document and ANSI/ASQC Q9001. QMS GPG's are prepared by organizations primarily concerned with the implementation of the element being addressed. QMS GPG's are reviewed by the QMSC prior to submitting to the Center Director for approval. The QMS GPG's shall be periodically reviewed to assess the need for modification. Table I identifies the GPG's that comprise this level of the QMS and cross-references them to the ANSI/ASQC Q9001 elements.

c. Directorate-Level QMS Procedures – Procedures developed by Directorates (at any level within the Directorate organization) used to implement the QMS GPG's within an organization. Such procedure(s) need not be developed if an organization can implement the QMS GPG without further clarification or tailoring. Directorate-Level QMS procedures are traceable to and cannot take exception to QMS GPG's

d. Work Instructions – Documents that delineate detailed activities to be carried out by an individual or group to accomplish a specific task or set of closely related tasks. Work instructions are required for activities that demand structured implementation, and for which generic training and skills are not, in themselves, sufficient to guarantee acceptable work. Work instructions can be forms, flowcharts, assembly procedures, inspection procedures, detailed process instructions, etc.

Document control and format requirements are addressed in Chapter 8.

Table 1

QMS GPG's

9001 ELEMENT	GPG NO.	TITLE
4.1	1060.1	Management Responsibility
4.2	1270.4	Quality System
4.3	1310.1	Customer Agreements
4.4	8700.1	Design Planning and Interface Management
	8700.2	Design Development
	8700.3	Design Validation
	8700.4	Technical Review Program
4.5	1410.1	Directives Management
4.6	5100.1	Procurement
	5100.2	Supplier Performance Records
4.7	5900.1	Control of Customer-Supplied Product
4.8	5310.4	Identification and Traceability of Products
4.9	8072.1	Process Control
4.10	4520.2	Incoming Inspection and Test
	5330.1	In-Process and Final Inspection and Test
4.11	8730.1	Calibration and Metrology
4.12	5330.3	Inspection and Test Status
4.13	5340.2	Control of Nonconforming Product
	5340.3	Preparation and Handling of Alerts and Safe Alerts
4.14	1710.1	Corrective and Preventive Action
4.15	6400.1	Handling, Storage, Packaging, Marking, Preservation, and Transportation
4.16	1440.7	Control of Quality Records
4.17	9980.1	Internal Audit System
4.18	3410.2	Employee Training and Qualification
4.19	NA	(Not Applicable to GSFC)
4.20	8070.2	Identification and Application of Statistical Techniques

5.2 Quality Planning

Projects delivering products within the scope of the QMS shall implement the documented QMS, including those project-specific plans and procedures developed by the Project to implement the QMS within the Project.

Product Managers, assigned by the performing Directorate, form the necessary project development teams and document the necessary plans to ensure that project requirements, derived from Customer Agreements (see Chapter 6) are satisfied. Such plans are tailored to the project requirements and may include:

a. Project Plan;

b. Project Systems Plan;

c. Project Technology Requirements Plan;

d. Project Technology and Commercialization Plan;

e. Project Operations and Business Opportunities Plan;

f. Assessment of Infrastructure and Upgrade and Development Plan;

g. Knowledge Capture Process Plan

At scheduled intervals, the Performing Directorate shall review project formulation, approval, and implementation.

5.3 GPG Implementing Quality System Requirements

GPG 1270.4, Quality System

CHAPTER 6. Customer Agreements

6.1 Review

Through the annual budget process, the GSFC establishes a customer agreement with NASA HQ for approved and on-going work at the Center. This agreement is documented in the Program Operating Plan (POP) process.

Other customer agreements are developed through a new opportunities process whereby the potential customer's advocating Center Directorate ensures that:

a. The customer's requirements are defined and documented;

b. Differences between the eventual contract and the original requirements are resolved;

c. The Center has the necessary capabilities and resources to satisfy the Customer Agreement.

Proposals less than or equal to a full cost of two million dollars are developed, reviewed, approved, and executed by the advocating Directorate. Proposals exceeding two million dollars are prioritized within each sponsoring Directorates and incorporated into a list of new Center opportunities for review, evaluation, and selection by the Executive Council. Those opportunities selected for development will result in Customer Agreements which satisfy the three criteria above.

6.2 Amendments

Proposed revisions to Customer Agreements will be evaluated by the Executive Council for approval or negotiation. Approved revisions to Customer Agreements will be provided to the affected Product Design Lead for consideration of impact to design and production via the applicable configuration control procedures (see Chapter 7).

6.3 GPG Implementing Customer Agreement Requirements

GPG 1310.1, Customer Agreements

CHAPTER 7. Design Control

7.1 Design Planning and Interface Management

Design control is the responsibility of the Product Design Lead (PDL). The PDL establishes design process goals and objectives by documenting the planned mode of implementation, including, but not limited to:

a. Make or buy decisions;

b. Using partnerships and agreements with other government, academic, or industry partners;

c. Selecting existing or new designs.

In addition to the above, the PDL's design plan defines:

a. Organizational structure, technical interfaces, and individual responsibilities established to develop, control, and verify the product design;

b. Logistics support and interfaces needed;

c. Personnel qualifications and certifications needed;

d. Design activities schedule;

e. Phased budgets for manpower and dollars;

f. Communication paths with the customer and within the design activity;

g. Methods for defining and documenting technical design interfaces.

7.2 Design Development

The PDL and supporting design team members document design inputs derived from customer, regulatory, and statutory requirements and develop detailed design schedules.

The PDL documents design output in terms of drawings, specifications, and/or procedures which:

a. Meet the design input requirements;

b. Contain or make reference to acceptance criteria;

c. Identify those characteristics essential to the safe and proper functioning of the product.

The PDL verifies the design via various activities, such as:

a. Drawing checks;

b. Finite element analysis;

c. Breadboard/prototype tests;

d. Software code walk-throughs;

e. Mathematical simulation.

Designs are base-lined and design changes are identified, documented, reviewed, and approved in accordance with applicable Directorate-level configuration control procedures.

7.3 Design Validation

For each design activity, the PDL documents a Validation Plan addressing applicable environmental tests, functional tests, final analysis, and test reviews. Validation events are planned at intermediate and final stages of product development.

7.4 Technical Review Program

In accordance with documented Technical Review Plans for each Project, the design and technical status of products is subject to both system reviews and peer reviews. The Technical Review Plans identify the schedule and subject of each planned review. Review teams are composed of appropriate specialists who are independent of the Project (systems reviews) or PDL (peer reviews). When warranted, technical reviews will result in requests for action from the team chairperson to the Product Manager (systems review) or PDL (peer review).

7.5 GPG's Implementing Design Control Requirements

a. GPG 8700.1, Design Planning and Interface Management

b. GPG 8700.2, Design Development

c. GPG 8700.3, Design Validation

d. GPG 8700.4, Technical Review Program

CHAPTER 8. Document Control

8.1 Document Approval and Issue

8.2 Document Changes

8.3 GPG Implementing Document Control Requirements

GPG 1410.1, Directives Management

CHAPTER 9. Purchasing

9.1 General

GSFC procurements are developed and administered in accordance with Federal Acquisition Regulation and the NASA Federal Acquisition Regulation Supplement.

9.2 Evaluation of Subcontractors

GSFC evaluates and selects subcontractors on the basis of their ability to meet contractual requirements, including the quality system and any specific quality assurance requirements. Evaluation of subcontractors is achieved by various methods, including:

a. Proposal evaluation;

b. Past performance evaluations by previous or current customers;

c. Pre-award and post-award surveys and audits;

d. Performance metrics surveillance;

e. On-site product verification by GSFC or its agent(s).

The type and extent of control exercised by GSFC over subcontractors is dependent upon the type of product, its impact on the quality of final product, and quality audit reports and/or records of previously demonstrated subcontractor capability and performance.

Potential subcontractor source lists are compiled in accordance with Federal Acquisition Regulation. GSFC maintains a Supplier Performance Records database which is considered during the subcontractor evaluation and selection process.

9.3 Purchasing Data

Procurement documents identify the product ordered, including applicable:

a. Type, class, grade, or other precise identification of items;

b. Title or other positive identification, and applicable issues of specifications, drawings, process requirements, inspections instructions, and other relevant technical data, including requirements

for approval or qualification of product, procedures, process equipment, and personnel;

c. Title, number, and issue of the quality system standard to be applied.

9.4 Verification of Purchased Product

GSFC proposals to verify product at the subcontractor's premises are specified in applicable procurement documents, identifying verification arrangements (including the potential use of verification agents representing the GSFC) and the method of product release. GSFC prepares Letters of Delegation to outside verification agents detailing agent responsibilities.

When specified in the Customer Agreement (see Chapter 6) GSFC allows the customer or his representatives to verify product at the subcontractor's premises. Such verification will not be used by GSFC as evidence of effective subcontractor quality control, absolve GSFC of the responsibility to provide acceptable product, or preclude subsequent rejection by the customer.

9.5 GPG's Implementing Purchasing Requirements

a. GPG 5100.1, Purchasing

b. GPG 5100.2, Supplier Performance Records

CHAPTER 10. Control of Customer-Supplied Product

10.1 Control of Customer-Supplied Product

Customer agreements (see Chapter 6) identify product to be supplied by the customer to GSFC for incorporation into supplies or related activities and identify related customer-specific storage and maintenance requirements when applicable. Such product is identified as customer-supplied upon receipt and verified per established GSFC incoming inspection and test procedures and instructions (see Chapter 13). Storage and maintenance of customer-supplied product is accomplished in accordance with established procedures (see Chapter 18), incorporating any identified customer-specific requirements. Lost, damaged, or otherwise unsuitable customer-supplied product is recorded and reported to the customer in accordance with control of nonconforming product procedures (see Chapter 16).

10.2 GPG Implementing Control of Customer-Supplied Product Requirements

GPG 5900.1, Control of Customer-Supplied Product

CHAPTER 11. Product Identification and Traceability

11.1 Product Identification and Traceability

GSFC identifies product and documents traceability from receipt and during all stages of production, delivery and installation by means of the Work Order Authorization (WOA) system. The traceability and identification of software product which does not employ the WOA system is accomplished in accordance with product or organization-unique documented procedures.

When required, permanent product identification marking is accomplished in accordance with applicable design documentation.

11.2 GPG Implementing Product Identification and Traceability Requirements

GPG 5310.4, Identification and Traceability of Products

CHAPTER 12. Process Control

12.1 Process Control

During design activities, the PDL identifies the production, installation, and servicing processes required to realize product development and process owners assess existing process capabilities in relation to identified requirements. Established or newly developed processes are carried out in accordance with documented Process Management Plans which address process controls, including:

a. Documented procedures defining the manner of production, installation, and servicing, where the absence of such procedures could adversely affect quality;

b. Use of suitable equipment, and a suitable working environment;

c. Compliance with reference standards/codes, quality plans, and/or documented procedures;

d. Monitoring and control of suitable process parameters and product characteristics;

e. The approval of processes and equipment, as appropriate;

f. Criteria for workmanship, stipulated in the clearest practical manner;

g. Suitable maintenance of equipment to ensure continuing process capability.

In addition to the above, for those processes which result in product characteristics which cannot be fully verified by subsequent inspection or testing (special processes), the applicable Process Management Plans shall also address pre-qualification of the process operations, including associated equipment, and:

a. Process operator training/qualification and/or;

b. Continuous monitoring and control of identified process parameters.

Records of qualified processes, equipment, and personnel are maintained.

Based upon the results of product verification and monitoring of process parameters, the continued effectiveness of processes is evaluated and processes are revised as necessary.

12.2 GPG Implementing Process Control Requirements

GPG 8072.1, Process Control

CHAPTER 13. Inspection and Testing

13.1 Incoming Inspection and Testing

Incoming product is inspected/verified upon receipt in accordance with applicable Receiving Inspection Instructions documented by the procurement initiators during the product procurement phase. The degree of incoming inspection and test activities, beyond the minimum of kind, count, and condition, is determined by the initiator, and is influenced by the amount of control exercised at the subcontractor's premises and the recorded evidence of conformance provided to GSFC.

Incoming product which is released for urgent production purposes prior to incoming inspection and test (except for mandatory kind, count, and condition inspection) is identified and controlled as nonconforming product (see Chapter 16).

13.2 In-Process and Final Inspection and Testing

All work to be performed upon GSFC product, including in-process and final inspection and testing, is documented or referenced on the GSFC Work Order Authorization Form developed by the PDL. Product is held from continued processing until satisfactory completion of planned inspection and testing, including the documentation of nonconforming product. All work operations are preceded by a verification that previously planned work, including inspections and tests, have been performed and results documented. At final inspection and testing and prior to release of product, all previous inspection and test events, from receiving through in-process, are verified as having been performed and that results meet specified product requirements, or have otherwise been properly identified and dispositioned, and associated data and documentation is verified as being authorized and available.

13.3 Inspection and Test Records

The Work Order Authorization form serves as the record of product inspection and test, indicating whether the product has passed or failed inspection and testing to defined acceptance criteria and identifying the inspection authority responsible for release of product. This form also identifies the documents providing evidence of control of nonconforming product.

13.4 GPG's Implementing Inspection and Testing Requirements

a. GPG 4520.2, Incoming Inspection and Test

b. GPG 5330.1, In-Process and Final Inspection and Test

CHAPTER 14. Control of Inspection, Measuring, and Test Equipment

14.1 General

The Office of Systems Safety and Mission Assurance and the Engineering and Safety Division maintain metrology and calibration laboratories servicing the GSFC Greenbelt and Wallops facilities respectively. These laboratories are responsible for:

a. Providing calibration and repair services and associated records for (IMTE), including:

1. Details of IMTE type;

2. Unique identification of IMTE;

3. IMTE location;

4. Frequency of checks;

5. Check method;

6. Acceptance criteria;

7. Action to be taken when results are unsatisfactory;

b. Establishing and documenting calibration intervals for IMTE;

c. Maintaining and operating the necessary reference, transfer, and working standards traceable to nationally recognized standards;

d. Operating a Calibration Recall System;

e. Maintaining a labeling system for IMTE.

14.2 Control Procedure

GSFC organizations employing IMTE in the development of product will maintain documented procedures which address the following:

a. Selection and use of IMTE in terms of its appropriateness, accuracy, and precision;

b. Ensuring IMTE is calibrated before use;

c. Ensuring IMTE is labeled regarding its calibration status;

d. Control of IMTE whose calibration status may change during use;

e. Responding to calibration due notices and identifying changes in calibration requirements to the appropriate calibration laboratory;

f. Assessing and documenting the validity of work done with IMTE subsequently found to be out of calibration, and performing suitable remedial action;

g. Ensuring adjustments to IMTE are performed by authorized personnel only.

14.2 GPG Implementing Control of Inspection, Test, and Measuring Equipment Requirements

GPG 8730.1, Calibration and Metrology

CHAPTER 15. Inspection and Test Status

15.1 Inspection and Test Status

Inspection and test status of GSFC product is maintained throughout production, installation, and servicing by means of the Work Order Authorization (WOA) form which travels and remains with the product. Among other things, the WOA indicates the conformance or nonconformance of product which it identifies and ensures that only product which has passed required inspections or tests or has otherwise been released under an authorized disposition is shipped, used, or installed.

Because of its diverse nature, the inspection and test status of some software product may not be amenable to the use of the WOA as a tool for status accounting. In these instances, the software product development organization will establish and maintain the procedure(s) necessary to identify software inspection and test status.

15.3 GPG Implementing Inspection and Test Status Requirements

GPG 5330.3, Inspection and Test Status

CHAPTER 16. Control of Nonconforming Product

16.1 General

The process for the control of GSFC nonconforming product provides for the identification, documentation, evaluation, segregation (when practical), and disposition of nonconforming product, as well as notification to the functions concerned.

16.2 Review and Disposition of Nonconforming Product

The review and disposition of nonconforming product is accomplished by the applicable Project Material Review Board, established and operating in accordance with a documented Project procedure(s). Authorized dispositions are:

a. Rework

b. Repair (may require customer concurrence when indicated in the customer agreement)

c. Use-As-Is (may require customer concurrence when indicated in the customer agreement)

d. Re-classify

e. Return to vendor

f. Scrap

Repaired or reworked product is re-inspected in accordance with original planning.

16.3 GPG's Implementing Control of Nonconforming Product Requirements

GPG 5340.2, Control of Nonconforming Product

GPG 5340.3, Preparation and Handling of Alerts and Safe Alerts

CHAPTER 17. Corrective and Preventive Action

17.1 Corrective Action

GSFC maintains documented procedures for corrective action of nonconformities relating to the product, process, and quality management system, whether discovered by internal verification activities or reported via customer complaint. All reported nonconformities are investigated for determination of the cause of the nonconformance and the commensurate action, based upon risks encountered, needed to eliminate the cause. Nonconformities are also investigated for affect upon and remedial correction of previously accepted or in-process product. The accomplishment and effectiveness of corrective actions are followed up by authorized personnel. Records of corrective actions and attendant investigations and follow-ups are maintained.

17.2 Preventive Action

GSFC maintains documented procedures for preventive action taken to eliminate potential nonconformities. The QMSC retrieves center-wide nonconformance data and analyzes it for systematic trends, patterns, and problems. The results of this analysis along with recommended preventive actions are presented to Center Management as part of the Quality Management System review (see Chapter 4). Center Management assigns appropriate documented preventive actions, which, after implementation, are evaluated for effectiveness by the QMSC or as prescribed in the original action item.

17.3 GPG Implementing Corrective and Preventive Action Requirements

GPG 1710.1, Corrective and Preventive Action

CHAPTER 18. Handling, Storage, Packaging, Preservation, and Delivery

18.1 General

GSFC Product Managers identify handling, storage, preservation, marking, packaging, and transportation (delivery) requirements for their products. These requirements are documented and updated as necessary and coordinated with the GSFC Transportation Officer to accommodate planning, establishment, and/or modification of processes, documented procedures, equipment, and personnel training to implement identified requirements.

18.2 Handling

To ensure that product is handled in such a way as to prevent damage or deterioration, handling devices and equipment are certified and maintained in accordance with established procedures and product handlers are trained, qualified, and certified as appropriate to operate such devices and equipment.

18.3 Storage

The Product Manager, in coordination with the Center Transportation Officer, assures that product damage or deterioration is avoided by using designated storage areas and stock rooms pending product use or delivery. Product delivery into and out of storage and assessment of stored/stocked product is accomplished in accordance with documented GSFC Storage Policy.

18.4 Packaging

The GSFC Transportation Officer assures that product is packaged, packed, and marked in accordance with the Product Manager’s documented requirements.

18.5 Preservation

The GSFC Transportation Officer assures that product is preserved in accordance with the Product Manager’s documented requirements.

18.6 Delivery

After final inspection and test, the GSFC Transportation Officer assures that the quality of product is protected during subsequent storage and/or delivery operations in accordance with the requirements of the Product Manager.

18.7 GPG Implementing Handling, Storage, Packaging, Preservation, and Delivery Requirements

GPG 6400.1, Handling, Storage, Packaging, Marking, Preservation, and Transportation

CHAPTER 19. Control of Quality Records

19.1 Control of Quality Records

Individual Quality Management System procedures and work instructions identify the specific quality records to be maintained and the custodians and locations of such records. Quality records are in physical or electronic format, legible, and filed in such a way as to accommodate on-site retrieval within one hour. Storage, preservation, maintenance (including retention times), and disposal of quality records is accomplished in accordance with Agency regulations.

When indicated in Customer Agreements, quality records are available for evaluation by the customer or customer representatives.

19.2 GPG Implementing Control of Quality Records Requirements

GPG 1440.7, Control of Quality Records

CHAPTER 20. Internal Quality Audits

20.1 Internal Quality Audits

Internal Audit Coordinators are appointed at the GSFC Greenbelt and Wallops Island facilities. The coordinators schedule internal audits on the basis of status and importance of the audited activity. Internal audits are performed by personnel, from an established auditor pool, who have no direct responsibility for the activities they are auditing.

Results of internal audits are recorded in reports to the management of the audited activity. These reports identify observed nonconformances and request timely corrective action. Follow-up internal audit activities are conducted to verify and record the implementation and effectiveness of corrective actions.

Results of internal audits and perceived nonconformance trends are reported to Center Management as part of management review of the Quality Management System (see Chapter 4).

20.2 GPG Implementing Internal Quality Audits Requirements

GPG 9980.1, Internal Audit System

CHAPTER 21. Training

21.1 Training

Supervisors identify and document training and qualification requirements for their employees in individual employee performance plans. Requirements are satisfied by appropriate employee education, training (formal and/or on-the-job), and/or experience. Supervisors assure that necessary on-the-job training is performed and recorded. Formal training is provided by the supervisor's organization or through the services of the Office of Human Resources. The Office of Human Resources maintains employee training and qualification records for training provided through that office. All other employee training and qualification records are maintained by the employee's supervisor.

21.2 GPG Implementing Training Requirements

GPG 3410.2, Employee Training and Qualification

CHAPTER 22. Servicing

22.1 Servicing

The servicing requirement is not applicable to the Goddard Space Flight Center at this time. If and when servicing applicable, appropriate documented procedures for performing, verifying, and reporting that servicing meets specified requirements will be established.

22.2 GPG Implementing Servicing Requirements

Not applicable at this time

CHAPTER 23. Statistical Techniques

23.1 Identification of Need

Statistical techniques for product inspection and test are identified by the PDL in appropriate inspection/test instructions. Process owners identify statistical techniques to be applied to the measurement and maintenance of identified process controls.

23.2 Procedures

The PDL identifies how statistical inspection and test techniques are applied and what product acceptance criteria are associated with each statistical technique. Process owners identify in each Process Management Plan (see Chapter 12) the application of identified statistical techniques employed.

23.3 GPG Implementing Statistical Techniques Requirements

GPG 8070.2, Identification and Application of Statistical Techniques